BARRIER FORMATION AND BUILDING PROTECTED BY BARRIER

The present invention is concerned with the formation of barriers against water entry and embraces buildings which have been protected by application of a barrier means thereto, which will prevent entry of water, such as flood water, into sub-floor area ventilators which are most commonly in the form of inbuilt air bricks. There is a need for a temporary flood protection means to be placed over sub-floor ventilators, such as air bricks, so as to prevent flood waters penetrating through the ventilator and into the building sub-floor area. If flood water penetrates through sub-floor area ventilators such as air bricks, there is likely to be damage to the building structure or foundations coupled with the difficulty of removing such flood water once it has penetrated into the sub-floor area and potential risks of damp or similar defects entering the internal parts of the building structure. Accordingly there is a need for a suitable barrier material, such as a water-proof or substantially water-resistant pad which can be applied to the ventilators, such as air bricks in a threatened flood condition and before flood water rises to a level where any of the material will be in contact with such water. In such threatened flood conditions it will be desirable for the material, which is most conveniently provided in the form of a pad, to be applied before flood water has reached the sub-floor ventilator level since the material may not bond or become bonded effectively to the brick work or mortar surrounding the ventilator with the consequence that a water proof or water impenetrable seal may not be created.

According to one aspect of this invention there is provided a method of forming a barrier against entry of water into a sub-floor ventilator of a building, which comprises adhesion of a sealant material to an external surface of said sub-floor ventilator. The ventilator preferably comprises at least one air brick within a wall of the building. The sealant material is most preferably a self-adhesive pad. This may be adhered to the external surface of the ventilator including the periphery of the ventilator. Preferably such self-adhesive pad can be adhered to the external surface of the ventilator and to building material immediately surrounding the periphery of the ventilator such as the adjacent brick work and/or mortar normally immediately adjacent the periphery of the ventilator.

The preferred self-adhesive pads used in the present invention are preferably removeable after use. Such pads may incorporate at least one self adhesive layer or medium. It is preferred for the sealant material (e.g. such self-adherent pads) to be flexible or at least semi-flexible. The

sealant material is conveniently formed, supplied and used as a pad which is conveniently rectangular and of a size generally to conform with or be slightly larger than the external dimensions of an air brick ventilator. Alternative embodiments of sealant material are contemplated. For example, such material could be provided in roll form, from which a user could cut suitable portions for application. Conveniently self-adhesive pads are resiliently pliable. The sealant material can be a composite of two or more layers, such as a laminate. It is preferred that one of the layers in a composite self-adherent pad is a removable release medium separable from the remaining layer or layers but without affecting the adhesiveness of the pad. The laminate may comprise a backing substrate, an adhesive substrate and optionally a removeable release liner medium. Such a backing substrate may conveniently comprise water proof plastics film and/or metal foil and/or water proof fabric material. Alternatively, a backing substrate could comprise an adhesive layer, or the backing substrate could be omitted in some embodiments. The adhesive substrate in some embodiments may essentially consist of an adhesive layer.

In such waterproof plastics film, film may be selected from one or more of the following materials, namely; polyester, polyethylene, polypropylene, and polyvinylchloride.

The metal foil, where used as a component part of the backing substrate can conveniently comprise aluminium foil optionally laminated to PVC, polyethylene, polyester or polypropylene film. The waterproof fabric material where used as a component of the backing substrate is conveniently selected , for example, from polyester spunbonded (non-woven) fabric and polypropylene spunbonded (non-woven) fabric although other materials of a similar nature could be deployed.

In relation to the aforesaid laminate the adhesive is preferably a rubber based adhesive, more preferably comprising butyl or polyisobutylene rubber, or alternatively comprising EPR (ethylene propylene rubber), SBR (styrene-butadiene rubber), natural rubber or thermoplastic rubbers such as SIS (styrene isoprene styrene), SBS (styrene butadiene styrene) or SEBS (styrene ethyl butylenes styrene). Other adhesive components useful in the sealant material in the form of self-adherent pads may typically include one or more of the following components, namely; bitumen, organic filler, mineral filler, polybutene plasticiser, mineral oil plasticiser, tackifying hydrocarbon resins; rosin esters, processing aids, anti-oxidant and pigment. The laminate most conveniently comprises a release liner preferably present as an

external layer prior to application of the material to a sub-floor ventilator. Such a liner may conveniently be comprised of at least one of the following materials, namely; siliconised plastic film such as siliconised low density polyethylene, polypropylene, polyester, high density polyethylene or silconised paper.

If release liner is not present as part of the sealant material, then the sealant material could be supplied as a self-wound roll, where the backing substrate is itself siliconised on one side.

In accordance with a second aspect, the invention also provides a method of forming a barrier in which the sealant material is in the form of a composite laminate comprising a release liner and which method includes the following steps:

a) providing a composite laminate including an adherent material and a release liner such that the laminate is in the form of a flexible or at least partly flexible pad,

b) removing the release liner from the composite to expose an adherent surface of the material,

c) positioning the adhesive layer of the pad such that its exposed adherent surface is brought into contact with the exposed external surface of a sub-floor ventilator,

d) applying the adherent surface to the said exposed surface of the ventilator and optionally into contact with the periphery of the ventilator and optionally into contact with building material surrounding the periphery of the said ventilator,

e) applying pressure to that surface of the pad remote from the said adherent surface to cause the pad to cover in a water-sealing manner the said external surface of the ventilator, and optionally:

f) removing the adhered pad from the ventilator after a flood condition or threatened flood condition, and optionally:

g) removing from the ventilator and/or the periphery of the ventilator and/or building material surrounding the periphery of the ventilator at least some excess adhesive material not removed in step f) above,

In a third aspect the invention also provides a building having a wall structure provided with at least one sub-floor ventilator, wherein a sealant material is adhered to an external surface of said ventilator, forming a barrier against entry of water into said ventilator. Similarly, such sealant material can be in the form of a self-adherent pad.

Such ventilator may typically comprise of one air brick. The self-adherent pad is preferably adhered to the external surface including the periphery of the ventilator. The pad can even more conveniently be adhered to the external surface of the ventilator and to building material immediately surrounding the periphery of the ventilator, such as the brickwork and/or mortar material immediately adjacent the periphery of the ventilator. It is preferred that within the scope of the third aspect of the present invention as defined above, the self-adherent pad is made or otherwise formed as defined above in connection with the first aspect of the present invention.

In application of embodiments of the invention it is most convenient and therefore preferred that the ventilator, such as the air brick, and the surrounding brickwork and/or mortar material to which the self-adherent pad is to bond, is cleaned prior to its application. In the absence of such cleaning procedures there is a risk that such self-adherent pads will not bond adequately or effectively to the ventilator and hence may not provide the protection against entry of water into the sub-floor area of a building as is intended.

On the external surface of the ventilator, and upon the brickwork and/or mortar materials immediately surrounding the periphery of the exposed surface of the ventilator, any algae, dirt and dust should be removed, ideally by brushing with a stiff brush. Any puddles of water remaining on the air brick or brickwork should be wiped off before application of self-adherent pad e.g. with an appropriate dry cloth. In application of embodiments of the invention wherein the sealant is in the form of a pad or a cut portion from a wound roll, the pad or portion should be applied at a temperature greater than 0°c and more preferably greater than 4°c. The pads, if stored in cold conditions, may be easier to apply if stored for e.g. thirty minutes in an ambient or warm room e.g. at a temperature in the region of 15-25°c and preferably 18-25°c. Prior to application of a pad incorporating a release liner, the release liner should be removed from the pad to expose an adhesive surface of the adhesive layer which is preferably pigmented or coloured so as to match the surrounding brickwork e.g. red or brown or reddy-brown in colour. Steps should be taken to prevent dirt or other contamination from becoming attached to the exposed adhesive surface. As soon as the surface of the adhesive component has been exposed for use, the self-adherent pad should be applied gently to the ventilator, and preferably so that the air brick will be located centrally with respect to the applied pad.

In the event that an implement such as a small decorating roller is available, working from the centre of the pad, it is preferred to roll very firmly outward to the edges, covering the whole pad area to ensure that the pad has bonded evenly across its whole area. In the absence of such a roller implement, then it is possible to use an item such as the back of a tablespoon. Again working from the centre, the pad should be smoothed outwards to the edges using good hand pressure upon the bowl of the spoon and ensuring that the whole pad is smoothed to obtain adequate and good adhesion to the air brick. For those embodiments of the invention in the nature of a self-adherent pad, it is desirable to ensure that the adhesive component is pressed well into the mortar courses and/or any surrounding brick work around the periphery of the air brick.

Once floodwater has been dispersed or the threat of a flood condition is rescinded, the self-adherent pads should be removed from the ventilators to allow air once again to circulate as normal through the air brick.

In order to remove such a pad, it should normally only be necessary to lift one edge and pull the adhesive surface component of the pad away from the air brick. Some of the adhesive component may remain on the brick work and/or mortar immediately surrounding the periphery of the air brick, upon removal of the pad. Dabbing the adhesive surface of the pad onto all such items of adhesive residue is likely to assist and may effectively remove most of the remaining adhesive. As indicated above, in preferred embodiments of the invention, the adhesive component is itself coloured so as to match the shade of the air brick and/or surrounding brickwork so that if any small adhesive residue remains after removal, such remnants are likely to blend in with the brickwork and so not impair appearance of the building after complete removal of the pad.

In order that the invention may be illustrated, more easily appreciated and readily carried into effect by those skilled in the art, non-limiting embodiments will now be described purely by way of example only, with reference to the accompanying drawing in which FIGURE 1 is a schematic view of a suitable self-adherent laminated pad for use in the present methods and for use in the building aspect of the present invention.

Referring to FIGURE 1 the laminated sealant material comprises an optional layer (1) of siliconised high density polyethylene release liner which may have a thickness of the order 40 to 100 microns, preferably 50 to 80 microns. Alternatively, this optionally present layer (1) may consist of siliconised low density polyethylene release liner layer with a thickness of the order 80 to 120 micron and preferably about 100 micron thick.

Adjacent the release liner (1) there is provided an adhesive component which is preferably an adhesive layer (2) which is butyl-rubber or polyisobutylene-rubber based. In this embodiment the adhesive component is pre-coloured a reddy brown to blend in with bricks of the building after removal should some adhesive debris be left behind. The thickness of this adhesive layer is not especially crucial, although in preferred embodiments the thickness is conveniently of the order 1-2 mm, such as 1.5mm thick.

The third component of the illustrated laminated sealant material is a backing substrate layer which as shown in Figure 1 itself comprises a composite bi-layer (3) which preferably consists of aluminium foil laminated to polyester film. The thickness of the aluminium foil is not especially crucial although for convenience this may have a thickness in the range of 10-30 microns or preferably 15-25 microns such as 18 microns thick. Similarly the thickness of the polyester film part of the composite bi-layer 3 does not appear especially crucial although for convenience it is preferred to use a polyester film having a thickness of 10-40 microns, preferably 15-35 microns, more preferably 20-30 microns, such as 23 microns thick.

With reference to the backing substrate of suitable self-adherent laminated pads, preferred embodiments of the invention are based on the use of a composite material which may consist of aluminium foil and polyester film laminated together.

In relation to the adhesive layer of suitable laminated self-adherent pads, it is preferred to use a butyl-rubber or polyisobutylene rubber based adhesive, filled with organic and mineral fillers and with polybutene and mineral plasticisers. Some processing aids, anti-oxidants and pigments are also preferably included within the formulation of the adhesive layer. Release liners, where present, serve to protect an exposeable adhesive surface prior to application of the pad to a sub-floor ventilator. As indicated in connection with Figure 1 herein, it is preferred for such release liner to comprise siliconised low density or high density polyethylene.

It will be apparent that the self-adherent pad embodiments are to be used as a sealant mainly for air bricks to protect them from water seeping through into the sub-floor area of a building, as a result of flooding. Application of the self-adherent pad is also useful in the event of a threatened or forewarned flood condition whether or not a flood subsequently takes place. To be most effective, the self-adherent pad should be applied to the air brick before the air brick has become in contact with water. The pad can be fabricated as a generally rectangular pad and of a size to cover standard size air bricks although a plurality of different sizes are possible. In order to apply the preferred product to a building structure, based on a three layered laminate, the consumer simply removes the backing release liner and applies the exposed adhesive surface across the air brick by applying pressure and working in the edges into the material surrounding the air brick using preferably an implement such as a small decorating roller or the back of a spoon. After a flood, or withdrawal of any threatened flood condition, the pad can be peeled away from all air bricks of the building upon which it has been applied and then disposed of. Any adhesive residue can be scrubbed off using a wire brush or alternatively by repeated application such as 'dabbing' of the removed pad. Embodiments of pads have been tested and were effective as a water sealant so as to prevent entry of water through an air brick into the sub-floor area of a building before the air brick has become submerged under water.

Reference will now be made to the following specific examples and test results:

Example 1

A self-adherent pad of sealant material was provided in the form of product reference Scapa 0314 which is a polyisobutylene-rubber based adhesive substrate laminated with an aluminium/polypropylene laminated film and including a siliconised release medium in the form of paper or film. The product Scapa 0314 is commercially available in the United Kingdom from Scapa UK Limited. The pad was applied to an in-built air brick ventilator which was subsequently exposed to water.

Example 2

A self-adherent pad of sealant material was provided in the form of product reference Scapa 0318 which is a polyisobutylene-rubber based adhesive substrate laminated with a spun-bonded polyester fabric and incorporating as part of the laminate prior to application, a

siliconised release medium in the form of paper or film. The pad was applied to an in-built air brick ventilator which was subsequently exposed to water.

Test Result 1

Specific sealant materials of examples 1 and 2, having been applied in the form of pads to the external surfaces of air bricks inbuilt as part of an existing building were demonstrated to be effective in preventing passage of water through the air brick, and capable of subsequent removal without impeding airflow after use. In particular pads of these materials were constructed and applied as indicated above to airbricks with up to two courses of bricks of a building above covered with water at a height of the order six inches above the upper most edge of the airbrick. It was found that no detectable water had penetrated through the sealed airbricks, and the pads could be removed after use without blocking or impeding airflow through the airbrick after removal.